

Meeting Summary: Sept. 27, 2010 N₂O Stakeholder's Meeting

Research Updates

CEC Contract, Johan Six

- Measurements continue at the following sites: Tomatoes (+ reduced tillage + drip irrigation)¹, almonds, vineyards at two sites, walnuts (one is an organic site). Intensive 7-day sampling follows mowing, irrigation and fertilizer events; every-other-day soil sampling is conducted concurrently.
- Harvest-related sample measurements are in progress
- Fall/winter sampling: Will monitor during/after rain events. As seen in the vineyards, the first rain is a critical sampling period.
- In November, Johan will forward presentations on the vineyard data and seasonal data for tomatoes and almonds that are anticipated to be presented at the American Society of Agronomy conference in Long Beach (conference details at: <https://www.acsmeetings.org/>).

CEC Contract, Martin Burger

- Sampling continues in two co-located alfalfa fields. Alfalfa rotation is typically every 4 – 5 years: study sites include a 5th year field and a second-year field. So far, no data are available, but fluxes have not been observed during cutting and irrigation. Sampling will continue through winter to capture annual emissions.

CDFA Contract, Dave Goorahoo

- Eddie Hard, Program Lead for the Fertilizer Research and Education Program (FREP) is the new staff contact for the current N₂O contract with CSU Fresno. He can be reached at: ehard@cdfa.ca.gov or by phone at: (916) 445-2549.
- Overall, the project is one year behind schedule. Staffing issues and instrument problems have delayed the start of sampling. UC Davis is running GC analyses for the project. CSU Fresno has constructed 16 environmental flux chambers and is building more. Supplemental data may be available from several related CSUF N₂O studies which all use the same sampling and analysis methodology. The silage and cotton sites are close to each other which makes sampling more convenient but limits the soil types under evaluation. If feasible, sites with more alkaline or saline soils may be evaluated later. A USDA ARI matching funds grant of \$239,000 over three years is available October 1 and will allow monitoring of current sites for 2.5 more years. Dave provided a project update which was forwarded to the stakeholder group; he will provide the next update in the spring of 2011.
- Cotton: Both sites are sandy loam soils. The Hanford site is Pima cotton, is conventionally fertilized and uses furrow irrigation. The second site is on the Fresno campus, fertilized with dairy effluent and also uses furrow irrigation. At both sites, sampling is conducted at three locations in each field: head, middle and tail. INNOVA readings are scheduled to begin Sept. 20. Flood irrigation makes flux chamber sampling difficult as planks need to be floated to access the sampler; the INNOVA samplers are floated and do not present access issues.

¹ Part of the David and Lucille Packard Foundation grant; see http://news.ucdavis.edu/search/news_detail.jasso?id=9136

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ARB & CalRecycle Contracts, Will Horwath

ARB Contract, Ongoing Research:

- Monitoring continues in tomatoes and alfalfa. The initial lettuce sampling, conducted at the Salinas Research Station and consisting of monitoring emissions from one annual crop, has been completed. To characterize the typical 2 crop per year practice, an additional field (heavy soil) has been added at a grower site which will be sampled during the full annual cycle.
- N₂O and CH₄ sampling in rice continues at Delta sites.
- Sample analyses are behind schedule but catching up now that the GC auto-sampler problem has been resolved by substituting a 2.5 ml auto-sampler for the 5 ml sampler. QC is being conducted to verify that samples that have been maintained at ambient temperatures for up to 6 weeks remain viable.
- It has been difficult to maintain the staffing levels required to conduct the intensive sampling. Students are not willing to commit for very long to low-visibility positions involving long hours at repetitive tasks.
- Presentations at the Long Beach SAS conference in November will focus on management options for tomatoes, alfalfa and lettuce.²

New ARB Contracts:

- Two new projects, set to begin this winter, will be conducted for a full year in concert with the ongoing research project. One study will evaluate NO_x at the same study sites as the ongoing research (http://www.arb.ca.gov/ag/fertilizer/kick-off_nox%2029jul2010-v4.pdf). The second project will evaluate N₂O emissions and determine N₂O emission factors in forage systems receiving dairy lagoon water, corral manure and inorganic nitrogen as fertilizer (http://www.arb.ca.gov/ag/fertilizer/kick-off_dairy%2029jul2010_v3.pdf).

CalRecycle Contract: This new research project will be conducted by Will Horwath of UC Davis. It will evaluate N₂O and CH₄ emissions from the compost life cycle, including emissions from finished compost additions to almonds, tomatoes and row crops. Recent research³ suggests that the traditional emission measurement methodology using flux chambers may underestimate compost emissions by as much as 90%. This is because CH₄ is thought to be moving so fast that it is not fully oxidized at the pile surface, where the samplers are located. The flux sampler thus “misses” the convective flux. The project’s sampling methodology will focus on micrometeorological measurements and eddy flux covariance analyses to accurately assess compost emissions.

Other Items

ARB

The 2011 Research Plan was approved by the Research Screening Committee (RSC) in September. In December, the RSC will review a study plan submitted by William Salas,

² http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6T3Y-4YNT8TV-1&_user=1928924&_coverDate=05%2F15%2F2010&_rdoc=1&_fmt=high&_orig=search&_origin=search&_sort=d&_docanchor=&_view=c&_searchStrId=1477577272&_rerunOrigin=google&_acct=C000055388&_version=1&_urlVersion=0&_userid=1928924&md5=6c052345df4bd5495ec2dcb0d1702309&searchtype=a

³ <http://www.ncbi.nlm.nih.gov/pubmed/20176844>

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“Developing, Validating and Implementing a Process Modeling System for California Agriculture Greenhouse Gas Inventories” (\$250,000). The study will develop a framework for collecting GIS and agricultural management data and link these data with DNDC process models to develop cropland and dairy N₂O, CO₂ and CH₄ emission inventories. Data from the ongoing CEC, ARB, CDFA, and CalRecycle projects will be incorporated into this framework. ARB will distribute the full proposal to stakeholders when it is available in October. If approved by the RSC in December, it will be submitted for Board approval in January 2011.

CDFA

CDFA, FREP and Western Plant Health Association (WHPA) are jointly sponsoring a conference “Fresh Approaches to Fertilizing Techniques, 2010”, on November 17-18, at the Holiday Inn Fresno Downtown-Convention Center. Early registration deadline is October 25. More information is available at: http://www.cdfa.ca.gov/is/fflders/frep_conference_2010.html

CEC

CEC has recently established a contract to evaluate GHG emissions from soils amended with biochar. The proposal will be made available to N₂O stakeholders..

Next Steps

The next N₂O Stakeholders meeting is tentatively planned for the second half of January, 2011.